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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,220	04/11/2001	Yasuhiko Nara	29284/541	9834

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EXAMINER

BERMAN, JACK I

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 05/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/832,220

Applicant(s)

NARA ET AL.

Examiner

Jack I. Berman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 9-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 9-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 5,578,821 to Meisberger et al. in view of U.S. Patent Number 6,259,960 to Inokuchi and U.S. Patent Number 6,263,099 to Maeda et al.. As was stated in the previous Office action, Meisberger et al. discloses an inspection apparatus for a circuit pattern comprising an irradiation apparatus (column 20) which uses lenses 95, 104, 125 to direct a charged particle beam 100 onto the surface of a substrate 57 on which a circuit pattern has been formed, detectors 32 for detecting signals from the substrate, memory 52 for storing the signal visualized as an image, a comparing apparatus (defect processor 56) for comparing the stored signal to a signal generated by a different region of the substrate (Meisberger et al. calls such comparison a "die-to-die" comparison), and a monitor 46 which is capable of displaying any of the signals, including those generated by the defect processor. Inokuchi discloses another inspection system that uses an SEM to inspect a circuit pattern for defects. At lines 1-3 in column 72, Inokuchi teaches that one of the steps for displaying the image of the defect is: "The magnification is adjusted so that the foreign material or defect portion assumes an appropriate size on the display screen." Maeda et al., on the other hand, teaches at lines 18-30 in column 29 that image magnification is related to the pixel size of a detected image. It would therefore have been obvious to a person having ordinary skill in the art to adjust the pixel size of the image displayed in the Meisberger et al. system in the manner taught by Maeda et al. in order to adjust the

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magnification of the image, as is taught by Inokuchi. Since defects that were much smaller than the width of the circuit pattern would not adversely affect the function of the circuit, it would have been obvious to a person having ordinary skill in the art to designate a pixel size in accordance with this width so that the displayed image is of the "appropriate size" mentioned by Inokuchi.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meisberger et al.. As is stated above, Meisberger et al. discloses an inspection apparatus for a circuit pattern comprising an irradiation apparatus (column 20) which uses lenses 95, 104, 125 to direct a charged particle beam 100 onto the surface of a substrate 57 on which a circuit pattern has been formed, detectors 32 for detecting signals from the substrate, memory 52 for storing the signal visualized as an image, a comparing apparatus (defect processor 56) for comparing the stored signal to a signal generated by a different region of the substrate (Meisberger et al. calls such comparison a "die-to-die" comparison), and a monitor 46 which is capable of displaying any of the signals, including those generated by the defect processor. In the amendment filed on February 25, 2002, Applicant argues that the claimed invention distinguishes over Meisberger et al. because Meisberger et al. irradiates the same region a plurality of times while the invention claimed in the instant application limits the SEM image to that obtained by irradiating a region only once. However, as was stated in the previous Office action, while the patent does mention at lines 33-46 in column 5 that it is "sometimes" necessary to scan regions repeatedly in order to generate images with sufficient contrast or to improve the image signal-to-noise ratio, the use of the word "sometimes" indicates that at other times Meisberger et al. generates image signals based on only a single scan of a selected region. Applicant has presented nothing to refute this

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interpretation of Meisberger et al.. Applicant has also amended claims 2 and 3 to require that after a defect is classified, its SEM image is again obtained and displayed. However, as was stated in the previous Office action, Meisberger et al. teaches, at lines 22-38 in column 3 and lines 56-58 in column 17, that the inspection apparatus classifies the defects found by the defect processor 56 based on features of the defects and the results of this classification are fed to the system computer 36 which in turn sends signals to the column control computer 42, to control further observation of the detected defects, and to the image display 46. The signals are also stored in memory block 52. It would have been obvious to a person having ordinary skill in the art to display these stored image signals at any point in the inspection method, including after the defect classification step. The person operating the inspection would have to see such displayed image signals in order to achieve the stated objective of inspecting the circuit patterns.

Claims 4, 5, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meisberger et al. in view of U.S. Patent Number 4,091,374 to Muller et al. and Inokuchi. Meisberger et al. teaches that in addition to a "die-to-die" comparison of different regions on the same substrate, the patented inspection system can also be used for a "die-to-database" inspection in which the image derived from the signals generated by the irradiation of a region on the substrate is compared to an image transmitted from an external apparatus (the database). Meisberger et al. does not specify how the various image signals are displayed on the monitor 46, but Muller et al. teaches that images from a real-time scan of a scanning electron microscope and from another source (such as an image storage tube) can be displayed in parallel on a monitor in order to view an orientation image (map display picture) as well as a working image (electron beam image). It would have been obvious to a person having ordinary skill in the art to

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apply the teachings of Muller et al. to the Meisberger et al. inspection system by displaying the two images in parallel on the same monitor. Inokuchi teaches, at lines 50-61 in column 18, to use apparatus of a type different than an SEM to extract defect information from a sample and to combine this apparatus with SEM type inspection apparatus, such as that disclosed by Meisberger et al.. It would have been obvious to a person having ordinary skill in the art to display the images formed by the different apparatuses in parallel on the same monitor in the manner taught by Muller et al.. Inokuchi also teaches, at lines 25-39 in column 19, that processing of the output from a defect image filing system can include adding comments. It would therefore have been obvious to a person having ordinary skill in the art to include information about the defects displayed as such comments.

Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inokuchi in view of U.S. Patent Number 5,973,777 to Nomoto et al.. As was stated in the previous Office action, Inokuchi discloses an inspection system for a circuit pattern comprising a preliminary inspection apparatus that inspects substrates and extracts defect information and transmits this information to a review SEM (an observing apparatus identical to that claimed in the instant application) that uses the coordinates of defects found by the preliminary inspection apparatus to observe these defects. In the remarks accompanying the amendment filed on February 25, 2002, Applicant argues that Inokuchi only discloses detecting the positions of foreign matter or defects on the basis of an edge of the wafer. This characterization of Inokuchi is incorrect. At lines 36-58 in column 63, Inokuchi teaches to use alignment marks on the wafer to properly align it in the inspection apparatus. While Inokuchi uses alignment marks that are already formed on the wafer for this purpose and records the positions of defects relative to these known marks, Nomoto et al.

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teaches, at 3-8 in column 6, that such marks can be written on a substrate near a defect by the inspection apparatus when a defect is discovered. It would have been obvious to a person having ordinary skill in the art to use Nomoto et al.'s marking apparatus to provide the alignment marks required by Inokuchi.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

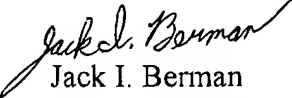
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (703) 308-4849. The examiner can normally be reached on M-F (8:30-6:00) with every second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (703) 308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


Jack I. Berman
Primary Examiner
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jb
May 23, 2002